Veterinary Diagnostic Laboratory
UNIVERSITY OF MINNESOTA
Driven to Discover℠

Report Status
In Progress 02/03/2020
Arno Wunschmann, Dr.vet.med. DACVP -Pathologist

Veterinary Diagnostic Laboratory
College of Veterinary Medicine
1333 Gortner Avenue
St. Paul, MN 55108

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Diagnostic Summary Report

Accession Number: D20-004113
Received Date: 02/03/2020
Reference:
Premises ID:
Date(s) Sampled:
Submitted by: DNR-Non Game & Wildlife Program
Attn: Pam Perry
1601 Minnesota Drive
Brainerd, MN 56401
US

Owner: DNR NON GAME
BRAINERD, MN
Site:
Species: Avian, Miscellaneous
Breed: Trumpeter Swan
Age: Adult **Sex:** Unknown
Weight: 9 kg

Status: Final
Preliminary: 02/04/2020 16:30:00
Preliminary: 02/06/2020 13:08:00
Final: 02/13/2020 15:47:00

History: This adult male trumpeter swan was found dead on a lake near the shoreline on February 03, 2020. The necropsy was performed by Melissa Wolfe, Dr. Albert Canturri and Dr. Arno Wuenschmann on February 04, 2020 between 2 and 3.15PM on the necropsy floor of the Minnesota Veterinary Diagnostic Laboratory.

Specimen: The whole carcass of an adult male trumpeter swan was submitted in a state of good postmortem preservation.

Necropsy: General condition: The animal was underweight based on the scant amount of internal adipose tissue (BW: 9.2kg).

Body cavity: There were no significant macroscopic lesions.

Integument: There were no significant macroscopic lesions.

Alimentary system: The ventriculus contained a silver metallic, non-magnetic approximately 3mm by 2mm by 2mm structure with a central opening (interpreted a fishing line weight). The ventricular mucosa was green (bile-stained). The liver weighed 217g (considered to be of normal size and weight).

Urinary system: There were no significant macroscopic lesions.

Respiratory system: There were no significant macroscopic lesions.

Endocrine system: There were no significant macroscopic lesions.

Hemolymphatic system: The spleen was mildly enlarged, light brown and soft.

Nervous system: There were no significant macroscopic lesions.

Reproductive system: There were no significant macroscopic lesions.

Cardiovascular system: The heart appeared to be mildly enlarged (weighing 119g). Less than 2ml of watery clear colorless fluid were present in the pericardial sac.

Locomotive system: There were no significant macroscopic lesions.

Histopathology: Slide A: Spleen, red pulp hyperplasia, moderate.

Tibiotarsal diaphyseal bone marrow, nsml.

Slide B: Lungs, thyroid gland and parathyroid gland, nsml.

Slide C: Liver: a. canalicular bile stasis, moderate to marked.

b. Kupffer cell hyperplasia and hemosiderosis, widespread.

c. accumulation of brownish granular pigment in hepatocytes, moderate.

d. hepatitis, lymphoplasmacytic, portal/periportal, mild.

Cerebellum and brainstem, nsml.

Slide D: Cerebrum, thalamus and mesencephalon, nsml.

Slide E: Cerebrum, thalamus and mesencephalon, nsml; (possibly capillary thrombosis with necrosis in one nucleus of the mesencephalon).

Slide F: Adrenal gland, testis, duodenum and pancreas, nsml.

Slide G: Heart, fibrinoid necrosis of myocardial vessel, focal with fibroplasia in adjacent myocardium.

Slide H: Intestine and kidney, nsml.

Slide I and J: Eyes, fibrinoid necrosis of a conjunctival artery/arteriole.

Toxicology: The liver lead concentration was markedly elevated (98.8 microgram/g). The liver iron concentration was moderately elevated (10605 microgram/g).

Molecular diagnostics: A cloacal swab was negative for avian influenza virus and Newcastle disease virus by PCR.

Diagnosis: Final

1. Hydropericardium, mild.

2. Ventriculus, intraventricular metallic foreign body.

3. Heart, fibrinoid necrosis of myocardial vessel, focal with fibroplasia in adjacent myocardium.

4. Eyes, fibrinoid necrosis of a conjunctival artery/arteriole.

5. Spleen, red pulp hyperplasia, moderate.

6. Liver: a. canalicular bile stasis, moderate to marked.

b. Kupffer cell hyperplasia and hemosiderosis, widespread.

c. accumulation of brownish granular pigment in hepatocytes, moderate.

d. hepatitis, lymphoplasmacytic, portal/periportal, mild.

Comments: The results of the toxicological analysis of the liver (in combination with the vascular lesions and heart lesion) are diagnostic of lead toxicity (see D19-007612, D19-007844 and D19-08203; last year's trumpeter swans from the same location). The presence of a non-magnetic metallic foreign body in the ventriculus is supportive of this diagnosis although chemical analysis of the metallic material would be necessary to prove that it was in deed composed of lead.

The significance of the elevated liver iron concentration that was also detected in last year's bird from the same location is uncertain but this finding is of minor importance compared to the lead intoxication.

The metallic foreign body and samples of spleen and kidney were saved frozen.

Dictated by: ARNO WUNSCHMANN, DVM, Dr. med.vet., Diplomate ACVP, PATHOLOGIST on 2/4 /2020 4:16 PM

Attending Specialist:

Electronically Signed By: ARNO WUNSCHMANN, DVM, Dr. med.vet., Diplomate ACVP, PATHOLOGIST on 2/13/2020 3:47 PM

Testing Summary

Laboratory/Procedure	Ordered	Count	Result	Quantifier	Interpretation	Result Value	Entered	Completed
Histology								
H&E Slide Preparation-Tissue	02/06/2020	10	Slide Prep Complete				02/06/2020	02/06/2020
Unstained Paraffin Sections-Tissue	02/07/2020	3	Slide Prep Complete				02/07/2020	02/07/2020
Immunohistochemistry								
Calcitonin IHC-Thyroid Gland	02/07/2020	1	Slide prep complete				02/07/2020	02/07/2020
Parathyroid Hormone IHC-Thyroid Gland	02/07/2020	1	Slide prep complete				02/07/2020	02/07/2020
MN Poultry Testing Lab								
Avian Influenza Vet Max Gold Real-Time PCR-Cloaca	02/07/2020	1	NEG				02/07/2020	02/07/2020
Newcastle Disease Matrix Gene Real-Time PCR-Cloaca	02/07/2020	1	NEG				02/10/2020	02/10/2020
Necropsy								
Nec/Gen Exam Zoo/Exotic/Wildlife 0-20 lbs-N/A	02/05/2020	1	Animals Examined				02/05/2020	02/05/2020
Necropsy/Histopathology Only								
Histopathology-Tissue	02/05/2020	1	See report				02/05/2020	02/05/2020
Outsourced Lab Service								
Minerals, tissues - MSU-Liver	02/07/2020	1	See report				02/13/2020	02/13/2020
Outsource Preparation-Liver	02/05/2020	1	Reference Lab				02/07/2020	02/07/2020

Remarks/Interpretations

Completed 02/16/2020 19:00:00

Outsourced Lab Service

Updates 02/13/2020 13:40:30, 02/16/2020 19:00:00

MICHIGAN STATE UNIVERSITY
VETERINARY DIAGNOSTIC LABORATORY

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REPORT OF LABORATORY EXAMINATION

Client:
Minnesota, University of (17479)
Veterinary Diagnotic Lab
1333 Gortner Ave.
St. Paul, MN 55108

Owner:
D20-004113 AW, -

Rcvd Date:	2/7/2020 1:53:00 PM	Animal:	1	MRN:	
Admitted By:	Wuenschmann, Dr.	Species:	Avian	Breed:	Trumpeter Swan
Ordered By:	N/A	Age:	Adult	Gender:	Unknown
Encounter:	02797440	Tag/Reg ID:			
CR#:	AP	Other ID:			

Minerals

Collected Date/Time (If Provided)	02/07/2020 13:54:00		
Procedure		Ref Range	Units
Specimen Tissue	Liver		
Dry Weight Fraction (Gravimetry) *	0.261	[0.260-0.340]	
Arsenic, Tissue (ICPMS)	<0.09	[<=9.00]	ug/g dry
Lead, Tissue (ICPMS)	98.85 H	[<=3.00]	ug/g dry
Mercury, Tissue (ICPMS)	<0.47		ug/g dry
Thallium, Tissue (ICPMS)	<0.09		ug/g dry
Cadmium, Tissue (ICPMS)	0.21		ug/g dry
Selenium, Tissue (ICPMS)	2.50		ug/g dry
Iron, Tissue (ICPMS)	10605.88		ug/g dry
Copper, Tissue (ICPMS)	87.40		ug/g dry
Zinc, Tissue (ICPMS)	349.27		ug/g dry
Molybdenum, Tissue (ICPMS)	1.92		ug/g dry
Manganese, Tissue (ICPMS)	6.04		ug/g dry
Cobalt, Tissue (ICPMS)	0.05		ug/g dry
Comment, Tissue Mineral	See Below		

L = Low Result; H = High Result; @ = Critical Result; ^ = Corrected Result; * = Interpretive Data; # = Result Footnote

Print Date/Time: 2/13/2020 12:31 PM

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Admitted By:	Wuenschmann, Dr.	Species:	Avian	MRN:	
Encounter:	02797440	Animal:	1	Owner:	D20-004113 AW, –

Minerals

02/07/2020 13:54:00 Comment, Tissue Mineral
Method: ICP-MS

Results: Lead poisoning.

Results are reported on a dry weight basis.
Tissue minerals may be compared against an internal dataset of 68 swan livers:

Heavy metals:
As: (<1.5 ug/g); Cd: (0.12 - 2.4 ug/g); Pb: (<1.5 ug/g); Hg: (<6 ug/g); Tl: (<7.5 ug/g)

Trace nutrients:
Co: (<0.3 ug/g); Cu: (9 - 450 ug/g); Fe: (900 - 5000 ug/g); Mn (3.5 - 13 ug/g); Mo (<0.9 - 1.8 ug/g); Se: (6.5 - 15.5 ug/g); Zn (70 - 400 ug/g).

We are working to develop better interpretations for hepatic trace mineral concentrations. These values may be adjusted as additional data become available

John P. Buchweitz, Ph.D., DABT
Clinical Toxicologist
2/13/2020 11:54:48 AM EST

2/7/2020 1:54:00 PM Dry Weight Fraction (Gravimetry):
Report Comment – Reference Ranges
Please note that reference ranges have been updated and will differ from those on reports issued by this laboratory prior to May 2015. In general the ranges are wider than before. Values within the reference range are those typical for animals that are adequately nourished and not suffering from intoxication. Reference ranges reported are species-specific and age-dependent.
For additional details on the use and development of these reference ranges, please see DCPAH Liver Mineral Reference Ranges available on our website: http://animalhealth.msu.edu > Diagnostic Sections > click on Nutrition or Toxicology.
Report Comment – Dry Weight vs. Wet Weight
Mineral values and reference ranges are reported on a dry tissue basis.
Dry matter fraction values below the reference range are unusual, but could potentially represent over hydration of the patient, or shifts in body water compartments due to electrolyte abnormalities.
Dry matter fractions above the reference are not unusual and may represent either dehydration of the patient or fatty infiltration of the tissue. In the case of fatty tissue, particularly liver or kidney, interpretation of the tissue mineral concentrations is affected.
For more information on dry weight vs. wet weight, including considerations for small samples, please see DCPAH Liver Mineral Reference Ranges available under Diagnostic Sections > Nutrition or Toxicology on our website at http://animalhealth.msu.edu.

View original document https://vdl.auxs.umn.edu/path-diag-report-web/document?id=58617&indb=true&caseId=D20-004113